

# ZOOGOER

March-April 1986



Reflections on 1985:  
FONZ Annual Report (p. 3)



# ZOOGOER

Volume 15, Number 2, March-April 1986

**FONZ 1985 ANNUAL REPORT**

## Friends of the National



is a nonprofit organization of individuals and families who are interested in supporting Zoo programs in education, research, and conservation. As members of FONZ, you and your family receive many benefits—publications, discount privileges, and invitations to special programs and activities to make your zoogoing more enjoyable and educational.

**ZooGoer** [ISSN 06313-416X] is published six times a year by Friends of the National Zoo, National Zoological Park, Washington, D.C. 20008. Non-member subscription is \$7.50 a year and is available only to institutions and to those residing outside the Washington, D.C., area. Third class mailing permit no. 6282. Copyright © 1986, Friends of the National Zoo. All rights reserved.

**The National Zoological Park** is located in the 3000 block of Connecticut Avenue, N.W., Washington, D.C. 20008, (202) 673-4717. Weather permitting, the Zoo is open every day except Christmas. Hours: From May 1 through September 15, grounds are open 8 a.m. to 8 p.m.; buildings, 9 a.m. to 6 p.m. From September 16 through April 30, grounds are open 8 a.m. to 6 p.m.; buildings, 9 a.m. to 4:30 p.m.

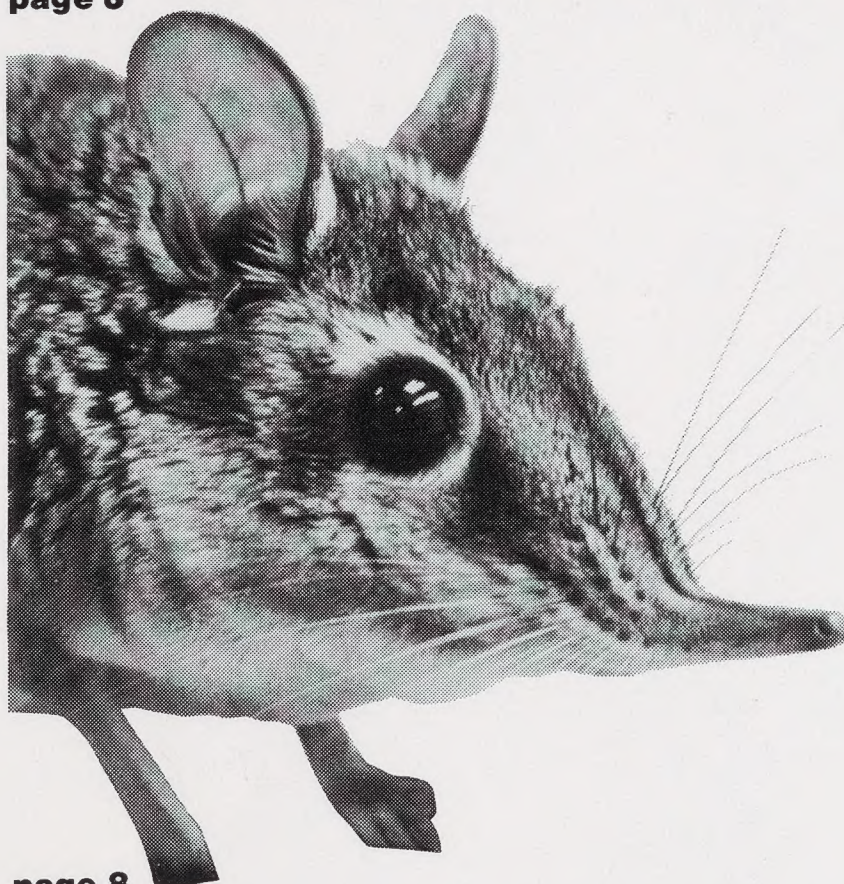
**FONZ Board of Directors:** Dr. Roscoe Moore, Jr., *President*; William Bryant, *First Vice President*; Janice Booker, *Second Vice President*; George Didden, III, *Treasurer*; Sylvia Samenow, *Secretary*; Marvin Address; Knox Banner; Josephine Burman; Janet Dewart; Marguerite Foster; Elizabeth Frazier; John Goldsmith; Anne Hamilton; William Hawkins, III; John Manton, Jr.; Georgianna McGuire; Dr. Gary Molyneaux; Monica Morgan; Ine Noe; Terry Peel; James Rogers; Merrill Rose; Louis Rosen; Nancy Schneck; Ross Simons; Kenneth Sparks.

**ZooGoer Staff:** *Editor:* Bettina Conner; *Consulting Editors:* Dr. Robert Hoage, Dr. Devra Kleiman, Judith Block, Dr. Scott Derrickson, Dr. Galen Rathbun; *Editorial Assistant:* Susan Weinberg; *Interns:* Kathleen Walsh, Margaret Parker.

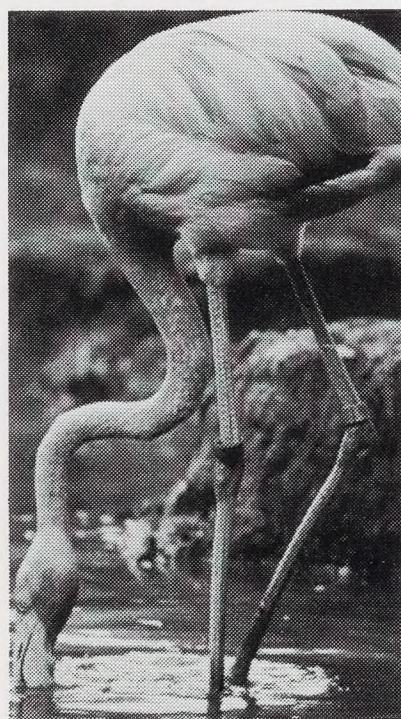
**Cover Photos:** A Barbary macaque pauses beside the Monkey Island moat (front cover). Pandu, a male Indian rhinoceros, explores his new home at the Elephant House (back cover). Cover photos by Milton Tierney.



page 3



page 8



page 20



page 23

## Zoo Booksigning

FONZ Guide Sally Tongren, author of *To Keep Them Alive: Wild Animal Breeding*, and Robert Hoage, editor of *Animal Extinctions: What Everyone Should Know*, will sign their newly published books on May 4 at the FONZ Bookstore/Gallery. Call 673-4957 for details.

## Contents

**Reflections on 1985: President's Report** 3  
by Dr. Roscoe Moore  
Another record-breaking year at FONZ generates exciting plans for 1986 and beyond.

**The Elephant-Shrew . . . by a Nose!** 8  
by Dr. Susan Lumpkin  
A FONZ-supported research project has uncovered some fascinating facts about a little-known species.

**A Child's-Eye View of the Zoo** 11  
by Susan Weinberg  
A young Friend of the National Zoo visits his favorite haunts.

**Warbler Watchers** 15  
by Judith Gradwohl and Dr. Russell Greenberg  
With the help of specially trained FONZ volunteers, two NZP researchers are tracing the behavior and survival of worm-eating warblers.

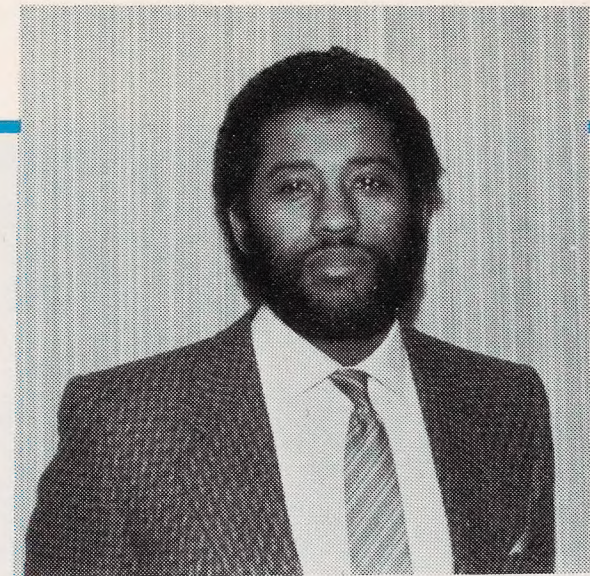
**FONZ Research Trainees** 17  
by Susan McGrath  
FONZ's investment in zoological training has paid off in valuable dividends for zoos around the world.

**Stocking the Modern Ark: Animal Acquisition at the National Zoo** 20  
by J. Fisher and R. Kraft  
Conserving both dollars and natural resources, zoos today breed, loan, and exchange exotic animals. But even acquiring "free" animals is costly, so FONZ's ZooFari benefit gives NZP a financial boost.

**Making History** 23  
As the National Zoo approaches its centennial anniversary, FONZ commemorates its own first quarter-century with the publication of *A History of the Friends of the National Zoo*.



## Reflections on 1985: President's Report to the Members of FONZ



Jim Mathews

Dear FONZ Members:

I am pleased to report to you about a year of successes and changes at FONZ. A new foundation for growth in services and income was laid in 1985, and we achieved record increases in revenues and net income. We have improved our support of the Zoo, strengthened our ability to serve the Zoo's public education and research goals, and provided improved services to Zoo visitors. In addition, FONZ has been an active participant in planning the future National Zoo, and we can look forward to playing an even more useful supporting role in the future.

### Master Plan and Centennial Year

In 1985, the Zoo developed a revised master plan which includes new exhibits, alterations in the walkways and plantings, and major new facilities for visitor services. At the same time NZP Director Michael Robinson and staff launched planning for the celebration of the 100th birthday of the National Zoological Park in 1989.

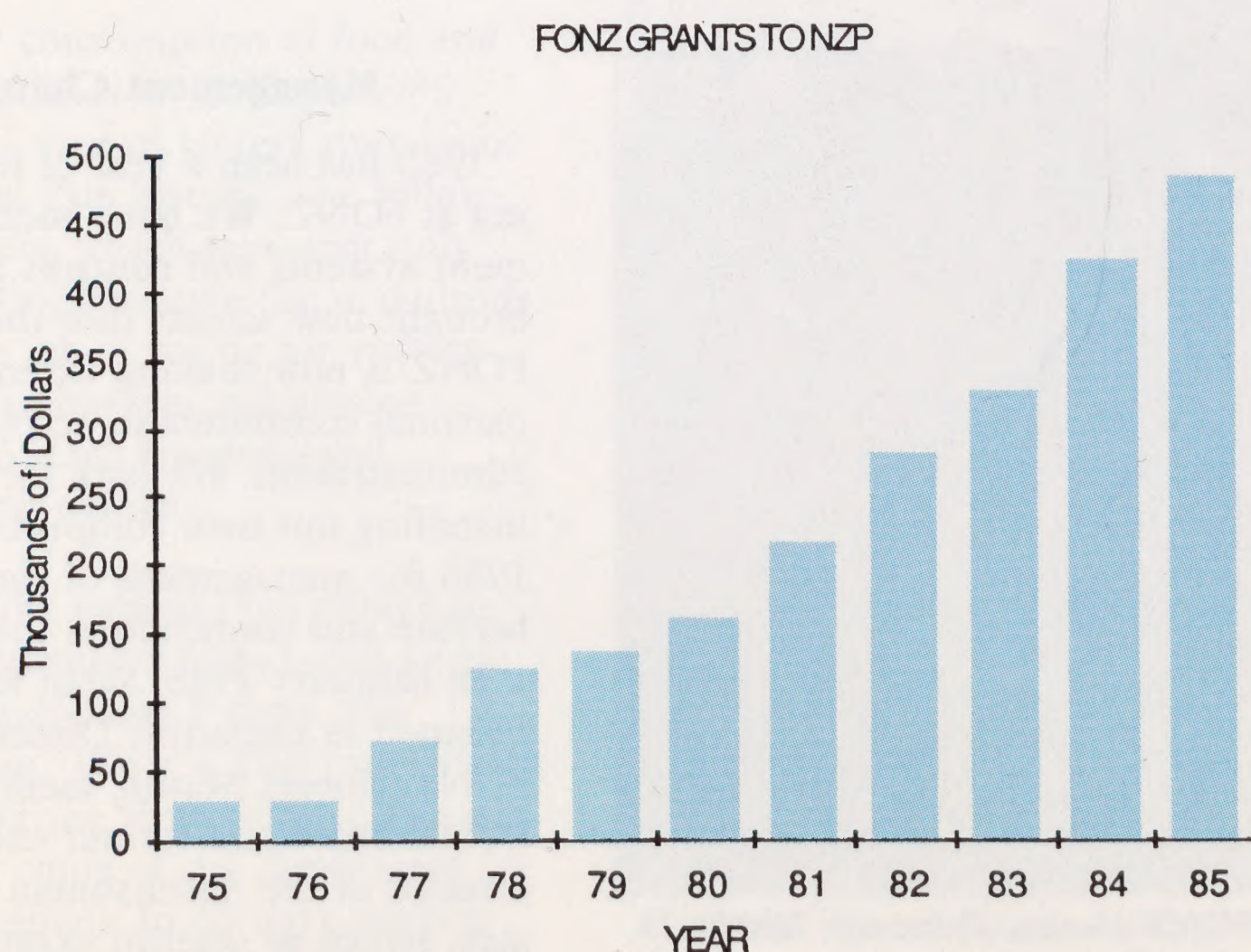
As the design of the future National Zoo takes shape, FONZ has consulted with Dr. Robinson regarding the replacement of temporary concession structures and improved visitor services. These plans entail financing several million dollars of permanent facilities of pleasing architectural design that will provide better service to more visitors.

FONZ has considered additional opportunities for providing better information and orientation for visitors. The first stage in 1986 may be a prototype information kiosk at the lower end of Olmsted Walk, a model for future installations at other entrances to the Zoo.

### Financial Highlights

FONZ financial support for the Zoo improved substantially in 1985. Revenues from membership and concessions were more than \$6 million—an 18 percent improvement from 1984 and a record. Total net income exceeded \$590,000, nearly 40 percent above the previous year's all-time record. FONZ provided more than \$485,000 in grant support for Zoo research, educational development, and public affairs in 1985. These funds went for research project assistants and aides, visiting scholars, research trainees, field studies, and symposia. Among the many projects that FONZ monies supported last year are:

- the golden lion tamarin reintroduction program;
- the Fifth NZP Symposium for the public;
- the study and use of artificial breeding techniques;
- a study of white-tailed deer;
- a study of population dynamics and genetics;
- an international training program in tropical wildlife conservation; and
- the establishment of a basic invertebrate collection at the National Zoo.



(continued on page 4)





**APRIL.** FONZ guide Juanita Lambert explains to a tour group how the giant panda and red panda are similar. Free guided tours of the Zoo are available throughout the year. For information call 673-4955.

Jessie Cohen, NZP Graphics



**JULY.** Panda-watch volunteers noted that Ling-Ling took plenty of rest breaks during her summer mornings outdoors.

John Witman



**DECEMBER.** To launch a new line of crafts in FONZ shops, Princess Maria Teresa and Prince Henri of Luxembourg visited the Zoo.

## President's Report

(from page 3)

FONZ has contributed substantially to the Zoo's research and special projects in education and public affairs in recent years. This support has enabled the Zoo to undertake projects that cannot be accommodated in the federal budget. Our level of volunteer service has kept pace, and in 1986 we anticipate broadening the types of specialized assistance available to all departments of the Zoo.

FONZ revenues for service to the Zoo and visitors come from membership dues, sales of food and merchandise, parking fees, gifts and contributions, and investments. In addition to providing research support, these revenues enable FONZ to collaborate with the Zoo's departments of public affairs and education in a variety of educational and information services. FONZ membership programs receive a portion of revenues; volunteer operations are supported; a substantial contribution is made to the Smithsonian Institution from concession revenues; and each year FONZ makes a small addition to its reserve funds, which provide for future assistance to the Zoo in capital improvements. The remainder of revenues go to the operation of FONZ's food, merchandising, and parking services.

## Management Changes

1985 has been a year of restructuring at FONZ. We have added management systems and controls and brought new talents into the staff. FONZ is now making extensive use of personal computers in accounting and administration. We look forward to installing our own computer early in 1986 for management of the membership and contributors lists.

In February 1985, Sabin Robbins resigned as Executive Director of FONZ. Robert Mason, member of the FONZ Board and former executive director of the Smithsonian Associates, served as interim executive director during the search for a new



executive director. In December, Sanders Lewallen, then director of the Atlanta Zoological Society, accepted the executive directorship of FONZ.

### Program Highlights

Volunteers remain the most valuable FONZ resource for the Zoo. FONZ supplied more than 47,000 hours of volunteer assistance for the Education and Volunteer Services program; 27,000 visitors took advantage of our guided Zoo maps; and 19,000 parents rented strollers for little children. The staff presented zoological films to 66,000 visitors and supplied 8,000 self-directed tour packets.

More FONZ members enjoy the Park each year. Approximately 18,000 members and a few friends attended the two ZooNights; 400 members participated in the adult Wildlife Studies Certificate series. The Safari Club membership has reached 250, and a dozen educational tours were taken to Africa, Australia, the Western United States, the Galapagos Islands, Baha, Papua/New Guinea, India and Nepal, and China. Some members went dog-sledding in Eastern Canada. Children came from many school districts around the city for the popular Summer Safari weekday programs. Generous members contributed funds to purchase 50 new benches in the Park, and others have planted additional flower gardens.

Visitors' consumption of food and soft drinks leads us to think 1985 may be the year of largest attendance in National Zoo history. The following numbers, which represent only nine months, illustrate the magnitude of FONZ's job of caring for visitors: 100,000 hamburgers and cheeseburgers, 165,000 hot dogs, and 765,000 soft drinks.

Late in the summer our Merchandising Department introduced a new FONZ-copyrighted T-shirt. The exclamation "What a Zoo!" appears on the front of the shirt below a group portrait of some of the Zoo's most popular animals. In 60 days, visitors bought 7,500 of these new shirts.



**MAY.** The Zoo's two Asian elephants helped celebrate ZooFari's 1985 Asian theme. In 1986, FONZ's benefit gala will highlight Brazil.



**JUNE.** FONZ members photographed painted faces against a jungle mural—a popular new ZooNight attraction.



**AUGUST.** By summer's end, predictions were already in that 1985 would see the largest attendance in National Zoo history.

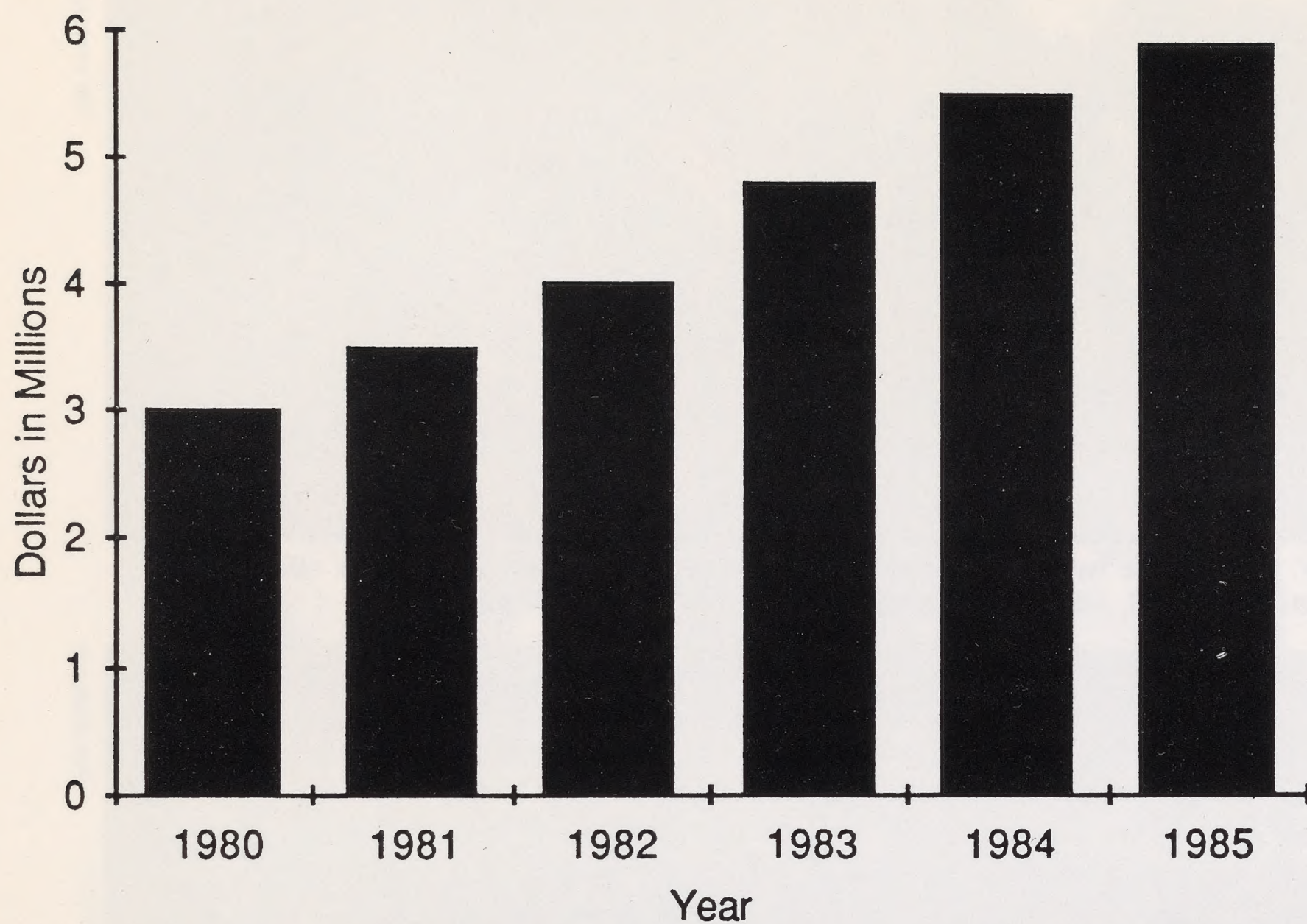
Pat Vosburgh

Pat Vosburgh

Pat Vosburgh



## FONZ Revenue Growth



Our FONZ Traffic Aides direct cars through the Park and try to help visitors find the last spaces on the many days when there are not enough to go around. In the first nine months of 1985, the Traffic Aides parked 270,000 cars and 8,000 buses.



### New FONZ Director

Throughout most of 1985, a joint FONZ-Smithsonian-NZP Committee considered hundreds of applicants for the position of Executive Director of the Friends of the National Zoo. The Committee's selection, Sanders Lewallen, has dedicated most of his professional career to advancing public understanding of zoological parks and their conservation goals. Before coming to FONZ, he was active in the development of two zoological parks and their support organizations—the Atlanta Zoological Society in Georgia and the North Carolina Zoological Park in Asheboro.

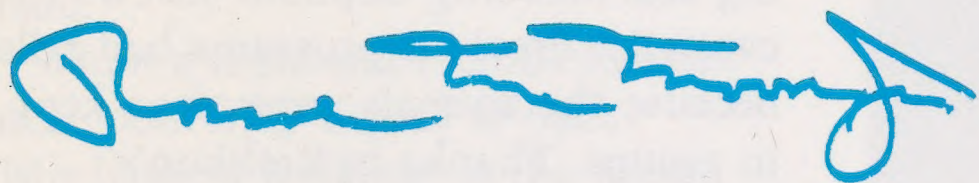
A native of northern Georgia, Lewallen received his formal education at the University of Georgia in Athens and at the University of North Carolina at Chapel Hill.

**OCTOBER.** *Washingtonian* Lisa Dean won first place in FONZ's 1985 photo contest, black-and-white category, for her portrait of a puma (left); Gary Jacob received honorable mention in the color category for his photo of a Bengal tiger (right).



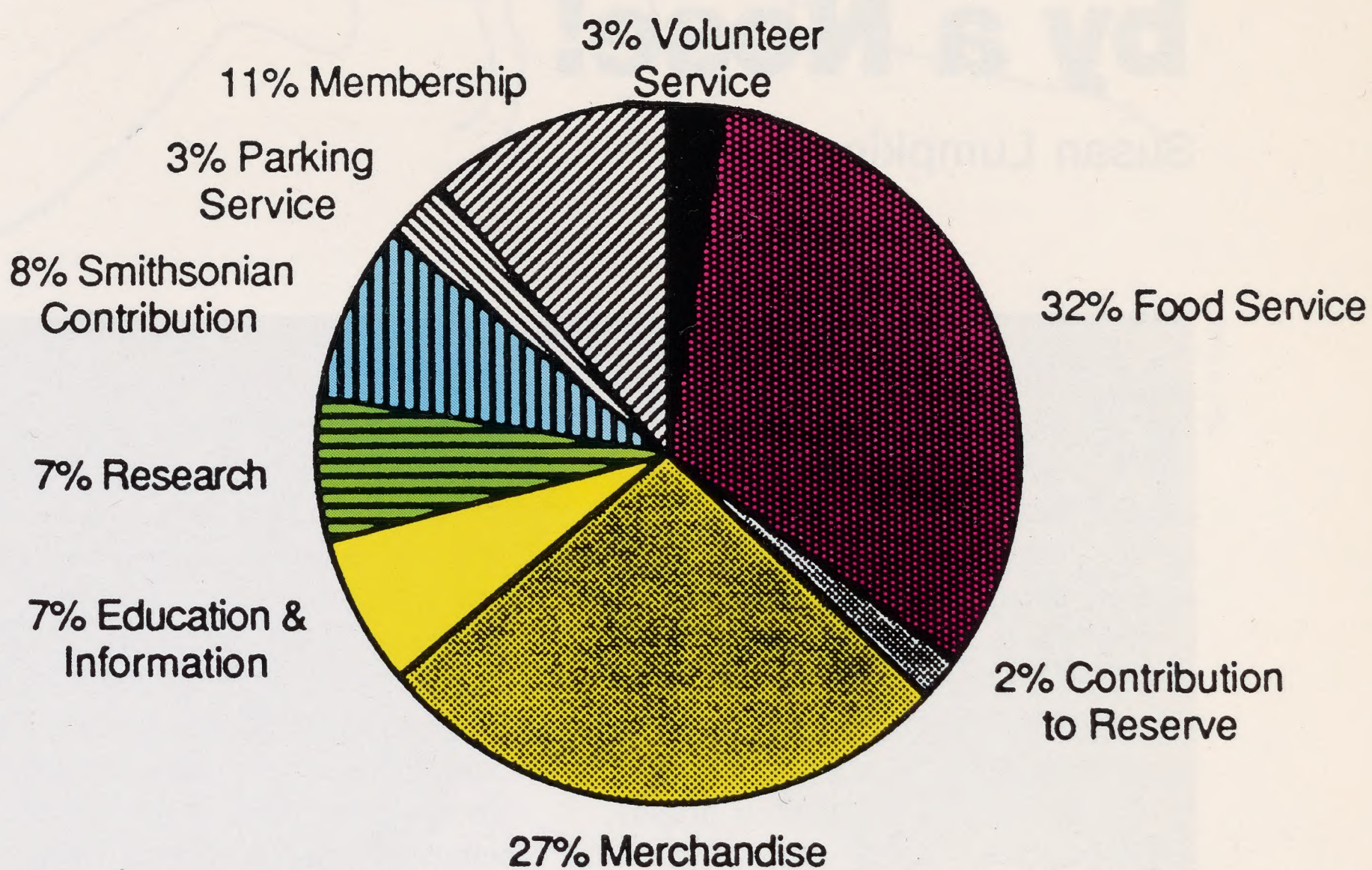
Numbers are fun to contemplate, but in the end FONZ's business is not measured in hot dogs, T-shirts, or dollars. It is service to the Zoo visitor, to the Zoo itself, and to the general public. Although FONZ has added global problems of habitat preservation and captive breeding and reintroduction of endangered animals to the widening scope of its support for the programs of the National Zoo, the original purpose of the FONZ is essentially unchanged from a 1965 resolution of the Board of Directors—namely, "the encouragement of a broader zoological interest and knowledge."

Sincerely,



Roscoe M. Moore, Jr., D.V.M., Ph.D.  
President, FONZ

Uses of FONZ Revenue (1985) Plus Volunteer Contribution





# The Elephant-Shrew . . . by a Nose!

Susan Lumpkin

**E**lephant-shrews come into the world nose first, and "nose first" they go through the rest of their nervous lives. Ever alert for danger, these tiny mammals depend on their noses as we do our eyes, mapping their twilight world primarily by scent. Their long, flexible noses twitch constantly, probing, sniffing, and exploring every detail of their brushy, dry habitat.

Neither elephants nor shrews, the 15 species of elephant-shrews, which are native only to Africa, have so many unique features that scientists have placed these small mammals in their own taxonomic order. For this reason, elephant-shrews make fascinating exhibit animals and are also the focus of intense research interest at the National Zoo.

They were first seen at NZP in 1948, when the Zoo provided temporary housing for 104 elephant-shrews imported from Africa for malaria research by the U.S. Navy. A few of them lived on at the Zoo for about three years, but more than 25 years passed before another group of elephant-shrews arrived in Washington.

In 1976, Postdoctoral Fellow Galen Rathbun returned from a three-year field study in Kenya with 22 rufous elephant-shrews for the Zoo's research collection. With FONZ support and the dedicated assistance of Gene Maliniak and the Department of Zoological Research keeper staff, Dr. Rathbun established the world's first viable breeding colony of captive

---

*Dr. Lumpkin, an NZP Research Associate, studied elephant-shrews while a Smithsonian Postdoctoral Fellow and a FONZ Senior Project Assistant.*

elephant-shrews. While others had failed in similar attempts, Rathbun's breakthrough was largely due to the insights gained from his painstaking field research.

Rathbun's key discovery was that elephant-shrews are monogamous. This fact, central to the success of the captive breeding colony, is hardly an obvious conclusion. Like human beings, elephant-shrews are among the mere three percent of mammal species that form exclusive mating pairs.

Once paired, elephant-shrews are highly territorial, defending large areas against all intruders. Males chase out male interlopers, and females chase out females.

Although they appear to pair for life, the sexes actually spend little time together. Mating is a brief and fairly infrequent affair, and the more aggressive, dominant female tends to repulse her partner's approaches at all other times. Food is not shared; in fact, the mates jealously defend mounds of termites, their preferred food, from one another as well as from neighboring elephant-shrews. Mates do not even rest together. (Elephant-shrews have never been seen actually to sleep.)

Nor could the bond between parents and young be described as close. The one or two young born in each litter are extremely precocious, capable of running within hours after birth. The mother does little but nurse the babies at infrequent intervals, while the father provides no direct care at all. The young first take solid food at about five days of age and are completely weaned within a month. Before the end of two months, parents drive the young from their territory to find a new home, or to perish. The

female then gives birth to a new litter, and this cycle is repeated throughout the year.

Rathbun used this information to develop appropriate methods for keeping and breeding elephant-shrews in captivity. Previous programs had failed because the animals were often kept in groups. Thanks to Rathbun's insights, elephant-shrews at the National Zoo are housed as monogamous pairs. Their enclosures are large and complex enough to allow the male, female, and young to avoid one another, with individual food dishes provided to prevent competition. As a further precaution, keepers separate parents and young early, about 30 days following birth. This practice protects the young from the parents' territorial aggression in the roomy, but nonetheless confined space of captivity.

The great success of these and other measures is apparent: More than 300 babies have been born and six generations raised since the original wild animals were brought to the Zoo. Descendants of our elephant-shrews are now displayed at zoos around the country, and many of these zoos have established breeding programs based on the NZP model.

## Curious Features

High-strung and furtive, elephant-shrews in the wild are rarely seen by people, so a major benefit of captive breeding is the chance to examine the curious features of these small mammals in close detail. Elephant-shrew research is now in its tenth year at the National Zoo, and each new discovery raises fresh questions for future investigation.

The elephant-shrew's sexual and



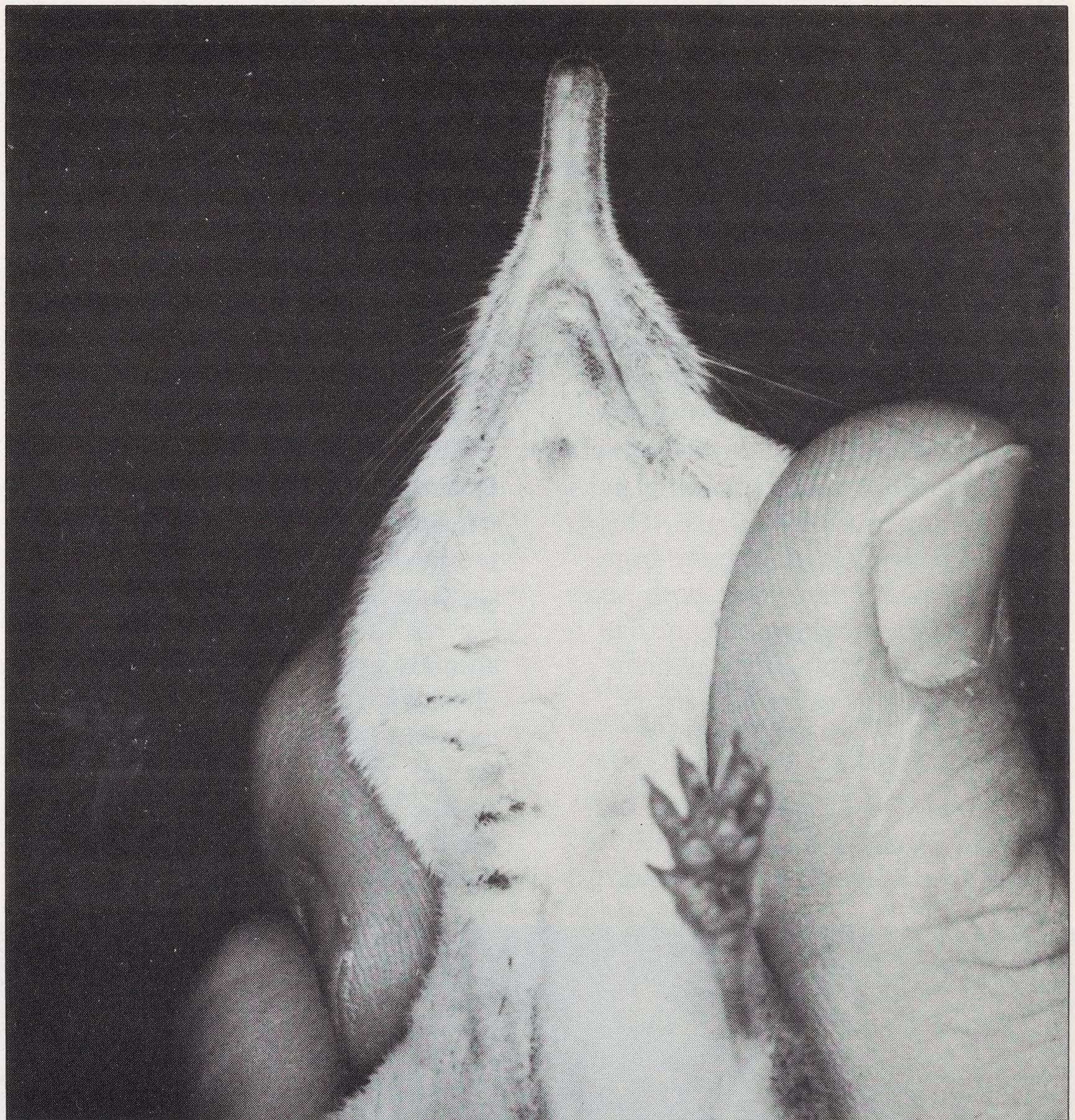
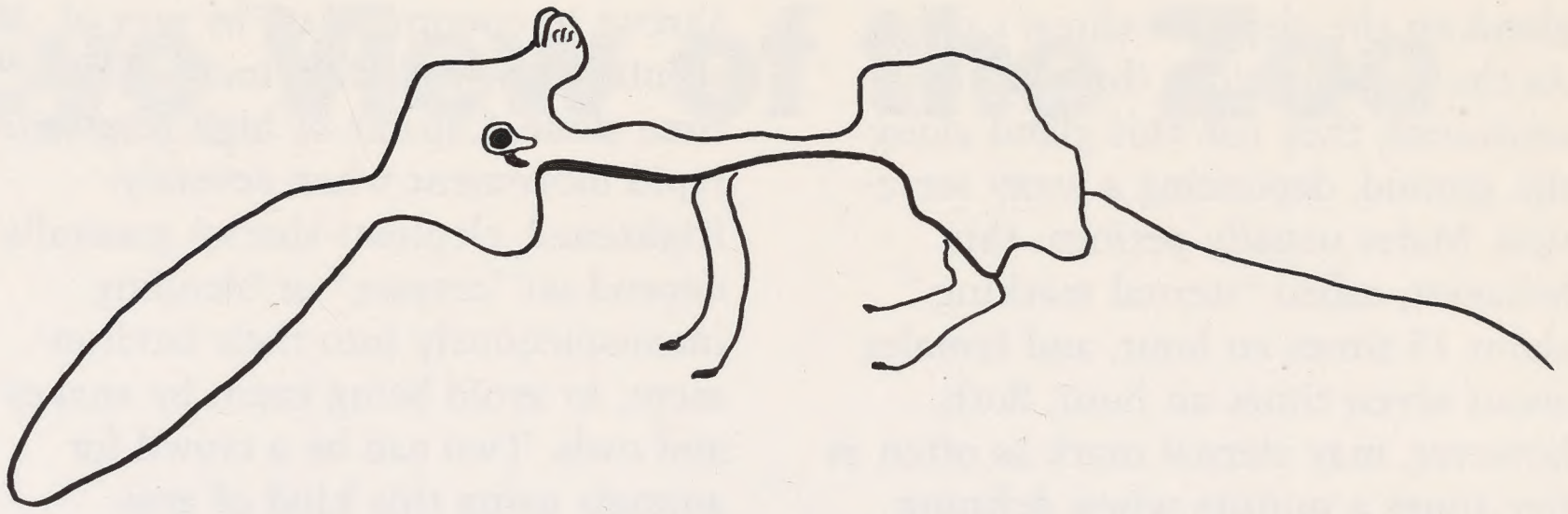
reproductive behavior within a monogamous breeding system is particularly fascinating. I worked with graduate student Fred Koontz and Zoo veterinary intern JoGayle Howard to describe these behaviors. We found that female elephant-shrews come into estrus about every 13 days unless they are pregnant. During estrus, they are willing to breed only for a few hours, usually in the early morning. A female in estrus alerts her partner by producing a copious vaginal secretion and depositing it throughout her territory. When the male comes across a patch of this secretion on the ground, he gives it a quick but careful sniff, then excitedly searches out his mate.

When a male and estrous female meet, courtship begins at once. "Mechanical walking" is the most striking courtship behavior—males and sometimes females extend their legs stiffly, making themselves appear as tall as possible. Like tiny robots, the partners circle slowly, each sniffing the other's tail area all the while. Breeding usually takes place within two or three minutes, and the actual mating lasts less than 10 seconds. With luck, a new litter of baby elephant-shrews is born about 60 days later.

### What the Nose Knows

The sense of smell dominates the lives of elephant-shrews. Especially important are the odors they produce themselves and use to communicate with one another, like the odor of the estrous female's secretion.

Koontz was particularly interested in the "message" contained in the odors produced by the large sternal



**Right: A pair of day-old elephant-shrew twins "back-rub" their father. Researchers believe this behavior may produce a "family" odor that helps family members identify each other and helps spread the new-borns' scent throughout the family's range. Center: Although not prehensile, as is an elephant's trunk, the elephant-shrew's sensitive nose is flexible enough to rotate in small circles. Top: NZP researcher Fred Koontz drew this caricature of the elephant-shrew to illustrate the relative importance of its body parts.**

Fred Koontz

Galen Rathbun



gland on the elephant-shrew's chest. As the animals move through their territories, they rub this gland along the ground, depositing a waxy secretion. Males usually perform this behavior, called "sternal marking," about 15 times an hour, and females about seven times an hour. Both, however, may sternal mark as often as five times a minute when defining new territory or interacting with a mate.

Through an elaborate series of experiments, Koontz deciphered the signals sent by these odors. Smelling the secretions, one elephant-shrew can determine the sex of another—no mean feat, as male and female elephant-shrews *look* identical. (Koontz even learned to identify the different odors of males and females—males smell "fruity," he says, and females "sulfurous.")

Still more impressive is the animal's ability to recognize the sternal gland odors of different individuals! This is how a female knows her mate from other males and vice versa. Both sexes are constantly marking and sniffing their territories, so paired elephant-shrews receive continual olfactory images of each other when they encounter the marks. Mates spend little time physically together, but they are always visiting through odors.

It makes good sense for elephant-

shrews to communicate by way of scents, while spending most of their time alone. Capable of high leaps and rapid movement when severely frightened, elephant-shrews generally depend on "crypsis," or blending inconspicuously into their environment, to avoid being eaten by snakes and owls. Two can be a crowd for animals using this kind of anti-predator strategy. In fact, the necessity of avoiding predation through crypsis explains much elephant-shrew behavior. For example, the animals rest but never sleep so as to be always alert to the approach of a potential enemy; the short estrus and rapid courtship and mating ensure that pairs are only briefly distracted and vulnerable; and the precocity of the young allows them to scamper away soon after birth if a looming predator is detected.

Current work in the Zoo's Research Department focuses on the energy costs to female elephant-shrews of producing and rearing these precocious babies. Postdoctoral Fellow Steven Thompson is observing the animals as part of a broad study of the physiological demands pregnancy and lactation place on various mammal species. While elephant-shrews rank among the smallest of his subjects, Dr. Thompson finds their relevance to his work out of all proportion to their

size: A set of newborn elephant-shrew twins weighs a total of about 20 grams—almost one-third the weight of the average mother! By comparison, a baby giant panda is only about one-two thousandth the weight of its mother, while a human baby is about one-fifteenth its mother's weight.

With that exhausting thought in mind, be sure to take a break during your next Zoo visit to stop and watch the elephant-shrew pair on exhibit in the Small Mammal House. Sharp-eyed visitors will see the animals sternal marking their home and may also observe another typical behavior called "trail clearing." Wild elephant-shrews build runways for quick escape through tall grass and brush; captive animals also build and maintain trails, habitually wiping debris from their paths as they travel through the leaf-littered landscape of their enclosure.

Spotting these animals may test your skill at camouflage detection, but it is well worth the effort to catch a glimpse of the wiggling "trunks" and odd behaviors that make rufous elephant-shrews such a remarkable species. No matter what the hour, the elephant-shrew is one Zoo animal you won't catch sleeping! □

---

**NZP veterinarians fashioned a tiny "cast" for this young elephant-shrew's injured leg.**





# A Child's-Eye View of the Zoo

Susan Weinberg

**I**t's Friday morning, half-past ten, and the early haze has lifted like a curtain, revealing a bright and surprisingly cool August day. From the aviary, whooped calls and responses announce that another Zoo weekend is underway, the hours as fleeting as the warm summer weather.

Over by the Glockenspiel, the De Prest family checks its bearings, ready, set, and eager to be off. Today's visit is a birthday celebration for three-year-old David, who has been named family Zoo guide in honor of the occasion. Leading his mother, Laura, and visiting Belgian grandparents, Rosa and Jozef De Prest (his father, Geert, must spend the day at work), David is bursting to share his store of time-tested tips on the sights, sounds, and pleasures of the Park. After all, this is the 19th time David has visited the National Zoo since his last birthday!

Plotting their course on a brand new Zoo map, David immediately traces the route to "the snakes!"—a request that comes as little surprise to his mother. Anxious to catch a glimpse of Ryma, the newborn Masai giraffe, Laura suggests a more "scenic" route.

Why not? The amenable guide climbs into his stroller, and the family convoy moves off.

"His majesty, the giraffe," Jozef addresses the animal that peers around the Elephant House wall at their approach.

Delighted by the frisky newborn, David points out other animal babies as the De Prests make their way down the hill.

A spirited voice rings through Beaver Valley, and the amplified sounds of playful splashing announce that the daily sea lion training session is on. Good timing: The De Prests take a seat on the poolside ledge, sharing panda-shaped ices as they watch the sea lions earn their fish. The animals leap and plunge as the audience calls out questions to the training interpreter.

"Do they ever go to sleep?" a doubtful visitor inquires.

"Oh, yes," the interpreter exclaims. "Where do you think they get all this energy?" An eager sea lion bounces through a hoop, then dives off to retrieve it. "Good girl, Esther," the interpreter praises.

"Where do they get their names?" people ask. "Why do they move their flippers like that?" "How on earth can they jump so high?"

An underwater window offers a fish-eye view of sea lions shooting like torpedoes through their pool. Another remarkable underwater scene lies 200 feet away, down a ramp and into a tunnel. There the polar bear (or portions thereof) can often be seen as he rests or swims in his private bathing pool.

"The polar bear is the masterpiece of our Antwerp Zoo," says Jozef. Still, he seems impressed with this National Zoo specimen,

to say nothing of the surrounding "masterpiece" of arctic landscape.

David is even more impressed. No, his mother has to explain, the "mountains" are *not* melting like so much ice cream in the sun—"they only *look* like peaks of ice and snow, so the polar bear feels like it's at home."

Paddling in the cool blue water, the bear certainly appears to be at ease, comfortable even in that thick fur coat.

How does NZP compare with European zoos?

"It's very open here," says Jozef. "And very clean, plus the routes are easy to follow. Now, the Antwerp Zoo is strong on the animals of Africa, especially those coming from Zaire, which used to be the Belgian Congo."

Next stop?

"Reptile House!"

## The Indoor Zoo

Mysterious things transpire in this cool twilight zone. An African soft-shelled turtle plays with a basketball in his tank, while nearby an oddly shaped stick (or could it be a Cuban crocodile . . .?) glides through the dark water of a jungle lagoon. At once drawn and repelled by the windows of snakes, David stares transfixed first at a rattler, then at an Indian python,

---

**Overleaf: A plump tree frog appears to grin at David through a window at the Reptile House. (Photo by Jessie Cohen, NZP Office of Graphics and Exhibits)**











and finally at three green and yellow emerald boas, hanging coiled from a branch like bunches of ripening bananas.

All day long, David has been firing off the answers to his own Trivial Pursuit agenda. The elephant, he claims, is the biggest Zoo animal, the pandas the best, the rattlesnake the scariest, the

alligator the longest reptile, the pelicans the fastest. (*Pelicans?!*) "Yes, because they are, that's all." But a stop at HERPlab, one of the Zoo's three discovery centers, gives David a chance to test and increase his knowledge of the reptile and amphibian world.

Volunteer Jennifer Izenour first brings out a pebbly brown toad,

then a snake and a turtle for the family to examine. Each animal arrives with its own set of quiz cards, though David seems to have a few answers of his own.

"Turtles don't make any noise at all, not *any*," he explains. "Turtles have no ears like we have, but just tiny little holes. This one goes very slowly and eats with this sharp little beak." And what does he eat? That's a hard one. "Popcorn, probably," is David's guess.

"Hmm," says Laura. "Don't you think he might prefer a chewy piece of leaf?"

Naptime is rapidly approaching, so there's only time for one final stop. It's siesta time in the sunny outdoor yards, too, but the indoor Small Mammal House is bustling with activity. A pair of marmosets groom one another, a small-clawed Oriental otter flashes and splashes around its tank, and a keeper coaxes an acouchi through a hollow log to accept an apple slice. An alert mongoose pokes out of a hole, tipping his head at sharp angles as he peers around. "He's looking for our slithering friends from the Reptile House," says Laura.

"Over here," Jozef beckons, waving everyone down to a crowded corner. "Look, David," he says, picking up his grandson to give him a better view. "It's the lazy ones—the sloths."

Hanging upside down by the grip of their curved claws, these creatures seem able to sleep through anything, even the current afternoon feeding.

"Naptime" is the key word here, and not just for the sloths. Another small mammal, of the two-legged variety, is rather weary himself, and after a hard day's expedition, would tell you if he could that it's really quite a job just to keep your eyes open . . . all the way . . . to the parking lot . . . and . . . home . . . soon. . . . □

Susan Weinberg



**On his way to visit the sea lions, David pauses under a Zoo map.**



# Warbler Watchers

Judith Gradwohl and Russell Greenberg

**F**or the past two summers a team of FONZ volunteers—working in four shifts a day—has helped “parent” a roomful of infant worm-eating warblers at the National Zoo. The young birds become independent in only about six weeks, yet in that time, a great deal of information can be collected on the early life of these remarkable migratory birds.

Worm-eating warblers (*Helmitheros vermivorus*) breed in the Washington area and throughout much of the Eastern United States. They winter in the forests of some of the larger West Indian islands, the Caribbean coast of Mexico, and northern Central America.

In spite of its name, the “wormer” never eats earthworms and eats no more caterpillars than any other warbler. But wormers show extremely specialized behavior in where they search for food during the nonbreeding season. About 80 percent of their foraging time and considerable energy is spent searching brown, curled leaves on trees and shrubs. The birds hang upside down and probe into each leaf to extract hidden insects and spiders. Most other wintering warbler species forage by searching live green foliage.

We raised young birds in a controlled setting to study how the birds develop certain aspects of their behavior. Observing young birds as they first begin to forage may provide answers to questions about how these birds—at only two months old—can travel thousands of miles to their win-

tering grounds and survive in an unfamiliar habitat.

Note-taking and observation, however, must be scheduled around the demands of round-the-clock care. Every half-hour for 13 hours a day, each warbler is fed three or four bits of meat mash on a tiny toothpick. With the eight birds requiring about 730 bits of meat mash a day, it is easy to see the need for lots of dedicated volunteers! However, these hard-working people are privileged to witness an exciting, accelerated version of the growing-up process.

When the newly hatched birds come into the lab in June or early July, they are about the size of a cherry. Naked and fragile, they must live in an incubator under the watchful eyes of researchers and volunteers, so that their body temperatures can be maintained. In these first few days of life, the nestlings do little more than

eat, sleep, and preen out their first set of feathers.

However, this initial helplessness is short-lived. At the age of 10 days, the birds announce their desire to leave the nest with a surprisingly loud chirp. Although their motor coordination is still poor, they laboriously struggle to the rim of the nest and jump. Once out, they cannot be persuaded to return. Instead, with wobbly balance but great determination, they hop about and explore their world. At this stage we keep the birds in medium-sized cages that allow them to move around freely but not hurt themselves. After that first bout of wanderlust, a fledgling spends most of its time on a single branch, sleeping.

After about 10 days out of the nest, the fledglings are able to fly around freely. From that age until they become independent, at six weeks old, the birds are very active and inquisi-



Jessie Cohen, NZP Graphics

**FONZ volunteers feed the eight young warblers more than 700 bits of meat mash a day.**

*Dr. Greenberg is an NZP Research Associate; Ms. Gradwohl is an assistant to the Zoo Director.*



tive. Housed in large aviaries, they pick and poke in earnest at a variety of objects. At this point we must chase down and feed the youngsters, in addition to carefully observing their developmental activity.

The final stage is the nerve-racking "weaning" period. Worm-eating warblers get their adult feathers at about three weeks of age and begin self-feeding even earlier than that, but they cannot be left to fend for themselves until at least seven to ten days after they take on full adult appearance. During this transitional period, the birds' human "parents" must foster the independence of their almost-grown offspring. The warblers must learn that there will be no more free lunches, a fact that comes as hard to them as to anyone. When the weaning process is complete, around mid-August, we usually throw a big warbler coming-out party—a happy finish for this tiring, yet rewarding, period of nurturing.

For the next stage of the research, the birds must be tricked into believing that their aviaries are Jamaica, Panama, or Mexico—their natural wintering grounds. Then we can

determine how much of their winter-time foraging behavior is instinctive, how much is learned through trial and error, and how much is influenced by their experiences during the youthful exploratory period. By raising the young birds in an environment where all objects are equally stocked with food, we can track their preferences under controlled conditions. The key question is: How much flexibility underlies these preferences? In the real world, food distributions and supplies change. Can the warblers shift their foraging behavior accordingly?

We found that, by 10 days of age, young worm-eating warblers have a strong innate preference for poking at dead leaves. At the age of three months, when they normally would be established on the wintering grounds, the birds no longer show a bias toward dead leaves. However, they do show a high degree of exploratory poking. This directs them to forage in nooks and crannies in the forest, and it may "prepare" them to learn that dead leaves are a superior place to look for food. Although these older worm-eating warblers are

relatively indiscriminate about whether they search live or dead leaves, they show a high degree of curiosity toward all foliage. When dead leaves are enriched with a preferred food, the birds readily learn to forage at them.

On the other hand, worm-eating warblers less than six weeks old may be more genetically programmed to poke at dead, curled leaves. This could induce them to practice the acrobatic foraging maneuvers they need to dead-leaf forage as adults in a new environment.

By studying how the highly migratory warblers respond to drastic habitat change, we can gain some insight into problems facing nearly all animals. What are the effects of environmental change? Can an animal cope with differences in food supply, habitat, or the number of competitors solely through behavioral responses, or are genetic changes required? The answers to these questions are particularly important today, with widespread habitat alteration and destruction. In a dramatically changing world, how readily can animals adapt? □

# Make Your Friends Our Friends

Make your friends our Friends by giving a FONZ membership. Membership in the Friends of the National Zoo in 1986 promises to be the most exciting ever. In addition to free parking, bimonthly publications, and member discounts, there are many special events planned just for members!

Best of all, by giving a FONZ membership you are sharing your support of many Zoo research and conservation projects, public programs, and the care and feeding of over 3,000 animals—many of which are endangered.



Please mail to: FONZ, National Zoological Park, Washington, DC 20008. For more information, call (202) 673-4960.

## Please give a FONZ membership in my name to:

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City/State \_\_\_\_\_  
Zip \_\_\_\_\_

## Membership Category:

- ☐ Family ..... \$30  
(includes children 3-16)
- ☐ Individual ..... \$20
- ☐ Couple ..... \$25
- ☐ Senior Citizen ..... \$12  
(individual or couple)
- ☐ Contributing ..... \$40
- ☐ Sustaining ..... \$75
- ☐ Patron ..... \$125 or more
- ☐ ZooGoer ..... \$7.50  
subscription only (outside  
the DC area)

## FROM:

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City/State \_\_\_\_\_  
Zip \_\_\_\_\_  
I.D. # \_\_\_\_\_  
(on your mail label)

Please charge my:

☐ Mastercard ☐ VISA

Acct. No. \_\_\_\_\_  
Exp. Date \_\_\_\_\_  
Signature \_\_\_\_\_

**My check for \$\_\_\_\_\_ payable to FONZ is enclosed.**



# FONZ Research Trainees

Susan McGrath

**Help Wanted:** surrogate monkey mother, bird bander, tree tagger, ape etiquette expert, giraffe nutritionist, lion social arbiter.

**Be Prepared For:** hard work, long hours, chiggers, ticks, wild animals, and other things that go bump in the night.

If Friends of the National Zoo ever advertised its Zoo research traineeships in the help-wanted section of the paper, the notice would probably elicit a flood of replies. After all, who wouldn't rather spend their workdays at the Zoo?

Although it doesn't take out ads in *The Washington Post*, FONZ does advertise the program extensively. Last fall, 1,000 brochures were sent to universities, institutions, and individuals around the country. This spring, 20 or more lucky souls, winnowed from hundreds of applicants, will receive letters awarding them 12-week research traineeships at the National Zoo.

The FONZ research traineeship program officially began in 1976, but FONZ had been supplying volunteer interns on an informal basis for years. Susan Trencher, the first Director of Volunteer and Educational Services, remembers, "Someone would write and say, 'I'm here for the summer and ...' or a scientist in Research would call and ask, 'Do you know any bright undergraduates who ...?' And we would do our best to match people up. Those interns were all volunteers, of course."

Then, in 1975, NZP zoologist Devra Kleiman suggested that FONZ start a structured program with stipends for the interns.

## Competitive Program

"We said, 'Look, we're getting all these applications,' " Dr. Kleiman recalls. " 'Why not establish a real, competitive program?' And so FONZ did."

That first year, 1976, FONZ awarded five research traineeships. This year, FONZ will award as many as 25.

How does one get selected for a traineeship? According to Program Administrator Mary Sawyer Hollander, "You come highly qualified. You've probably already had some experience in the field—banding birds, volunteering at a zoo, helping a vet, or designing graphics for a local program. And you may already know what you'd like to work on at the Zoo."

A committee of Zoo scientists makes the final selection, choosing the applicants with the most to gain as well as those with the most to offer. Once they know who their trainees will be, Zoo supervisors develop jobs for them. "We try to design a project so that a trainee can complete it in 12 weeks," explained staff mammalogist Miles Roberts. "Then the interns can work independently and emerge with a real sense of accomplishment at the end of their traineeships."

Despite the emphasis on education, the trainees contribute to the Zoo's work in substantial ways. For example:

- Trainees helped determine the gestation period for tree kangaroos at the Conservation and Research Center. This was no mean feat. It takes three people armored with heavy leather gloves to check the pouch of



FONZ's 1985 summer interns pose outside the Zoo's Education Building.

Science writer Susan McGrath is a former FONZ research trainee. She claims to hold the 1977 record for most chigger bites in a single traineeship.

Jessie Cohen, NZP Graphics





one understandably reluctant tree kangaroo.

- A trainee made behavioral observations of the Zoo's lions, collecting data for a detailed management plan that includes guidelines for establishing social groups. Another trainee did a similar study of the Zoo's gorillas.

- In an interesting reversal, several trainees collected data on visitor behavior. (If you get the feeling someone's watching next time you visit the Zoo, you may be right!) Their observations and interviews were translated into detailed visitor profiles that help the Zoo's Education and Public Affairs offices plan and evaluate their activities.

- Interns in the Office of Graphics and Exhibits have designed award-winning posters and many of the signs now seen around the Zoo.

- A trainee developed a data-base program to generate infant survivorship information on the almost 1,500 golden lion tamarins born in captivity since 1970. This information went into the species' studbook, which records genealogies of the rare animals and serves as the basis for future captive breeding work.

- Two horticulture trainees have been identifying tree species on the Zoo grounds and recording the results in a computerized inventory. What have they found? "The Zoo is bordering on monoculture—too many trees of the same species," said NZP Horticulturist Ric Hider. "The primary species is tulip poplar, which is a good-looking, native tree, but there are superior long-lived shade trees that should be in the Park." Eventually, Hider said, the National Zoo will have one of the most advanced computerized shade tree management systems in the country.

### Significant Contribution

Trainees have collected important data on most species at the Zoo—Père

---

***From ungulates at the Conservation Center (above) to the gorillas of the Great Ape House (left), FONZ research trainees have collected important data on almost every NZP species.***



David's deer, Reeve's muntjacs, tarsiers, gibbons, giraffes, pandas, raccoons, servals, and Geoffroy's cats, to name a few. Their work has made a significant contribution to the world's understanding of the biology, management, and behavior of these animals.

In turn, the trainees are given an opportunity to live through the full cycle of a research project, and they often publish their results. Best of all, according to 1982 trainee Martha Van der Voort, "You're at the Zoo! At lunch you can sit in on a seminar, or check out the polar bears, or coax war stories out of the keepers. There's a terrific sense of community. You sit around in the evening and talk about the animals, compare notes, and catch up on research that's being done elsewhere. You just soak it all up!"

### Pivotal Experience

The experience is pivotal for many trainees. Those 12 weeks serve as a sort of litmus test. Is this a field that challenges and rewards them?

Many find it is. They complete the program with a renewed commitment to research and gain a clear sense of what they want to accomplish in graduate school.

Others realize that they prefer a more hands-on relationship with animals than research allows. A surprising number of these interns go on to vet school, while others become keepers.

Some research trainees discover that they belong in other related fields of work, such as environmental sciences. And, of course, one or two former trainees are perhaps selling used cars, hoping never to see an exotic animal or an observation sheet again.

Is the program a success? Trainees and Zoo staff alike respond with a resounding yes. But you don't need to take their word for it. Here is a better measure of success: A number of former FONZ interns are now on the staffs of zoos around the country. Ten years old this year, the FONZ research trainee program is creating a network of young scientists and zoo specialists that will influence the quality of care and research at zoos around the world. □

## Portrait of a Traineeship

**I**n April of 1982, Martha Van der Voort arrived at the National Zoo to begin her research traineeship. She was to be stationed at the Zoo's Conservation and Research Center in Front Royal, Virginia.

"Eugene Morton, the Curator of Birds, suggested I get a ride to Front Royal in the Zoo van," Martha recalls. "I climbed in and there, neatly crated, were six maned wolf cubs. And boy did they smell! We drove out to Virginia with those cubs yapping and stinking, and I thought, 'Yep, this is going to be different.'"

Martha's 12 weeks were spent studying the rate of return of Kentucky warblers from their wintering grounds in Mexico to their breeding habitat in Virginia. This ongoing study takes a new approach to the questions raised by rainforest destruction: Is clear cutting in the tropics affecting migratory birds?

"Kentucky warblers return to the same spot every year to breed," Martha explained. "By measuring the rate of return, we can estimate how deforestation in Mexico is affecting the warbler population. Other studies have indicated that a 60 percent rate of return is to be expected under normal conditions, where neither habitat is particularly disturbed."

Armed with a mobile mist net unit, which made her look a little like a roving badminton player, and a highly sensitive tape recorder (Dr. Morton had loaned it to her with the mild admonition, "If you break it, I'll kill you!"), Martha headed for the hills every morning at daybreak.

Once at the study site, a 100-year-old stand of deciduous hardwoods, she switched on the tape recorder and played warbler calls. With luck, a furious bundle of yellow and black feathers would hurtle down from the

sky. Martha would catch the bird, band him (only males respond to the recorded calls), and set off for another territory. When she netted a bird that already wore a band, Martha noted the numbers and released the bird.

By the end of the breeding season, Martha had grim news to report: Only 23 percent of the birds banded the previous year had returned to breed at Front Royal. Those that did return were netted in the very same territories they had occupied in previous years. The conclusion: Deforestation in the tropics is adversely affecting the migratory bird population, at least in the case of Kentucky warblers.

"The news was discouraging," Martha admits, "but the message is an important one. Conservation knows no borders." At the conclusion of her traineeship, Martha accepted a job with the World Wildlife Fund. She is currently setting up bird conservation projects in Nepal.



**Martha Van der Voort bands a Kentucky warbler.**



# Stocking the Modern Ark: Animal

J. Fisher and R. Kraft

**N**egotiations to acquire zoo animals can sometimes be as complicated as a Geneva conference. The business of getting an interesting mix of exotic animals is one of the most intriguing since Noah stocked the Ark.

Often international in scope, the search sometimes sends zoo curators to the four corners of the world. They pay cash for animals, trade animals for other animals, and give or lend their charges to other zoos for breeding purposes. Modern zoos have become increasingly successful at breeding animals in captivity, which makes them less reliant on animal purchases.

"Our goal," said the National Zoo's Public Affairs Director Robert Hoage, "is to become a producer of wildlife rather than a consumer."

"A lot of considerations are involved before we acquire a new animal," explained William Xanten, the National Zoo's curator of exhibits. "We must decide whether a creature has educational value and will be of interest to the public. Will it help show the diversity of animal life? Is the species so little known to science that it will have great value as a subject of study? Will it fit into a breeding program at the Zoo? Can our facilities accommodate it? By acquir-

ing an endangered animal, are we furthering the cause of conservation?"

The main criteria, said NZIP Registrar Judith Block, are public education and species preservation. Most exhibit animals are chosen for their educational merit. The animals in the Small Mammal House, for example, are chosen because they are active or visually interesting. Reptile Collection Manager Michael Davenport favors the Surinam toad not only because it is long-lived and readily available, but also because it has an unusual reproductive feature—the male imbeds eggs in the female's back.

Once the decision has been made to

Jessie Cohen, NZP Graphics



*Increasingly, zoos are relying on their own breeding programs to maintain their animal populations. Three of the National Zoo's six orangutans, for example, were born at NZP.*

Milton Tierney



*In 1985, the San Diego Zoo loaned NZP a male Indian rhinoceros, Pandu, for a planned breeding program. Although the*



# Acquisition at the National Zoo

get a new animal, the National Zoo usually checks with other zoos in the United States to determine what's available and where. Other valuable sources of information include the computerized International Species Inventory System and the American Association of Zoological Parks and Aquariums' monthly newsletter "Animal Exchange."

Very little is certain in the zoo pricing business. The "king of beasts," the African lion, has thrived in captivity and is a glut on the market, while scarce Asian and African hoofed stock are expensive and difficult to obtain. Moreover, the cost of animal acquisi-

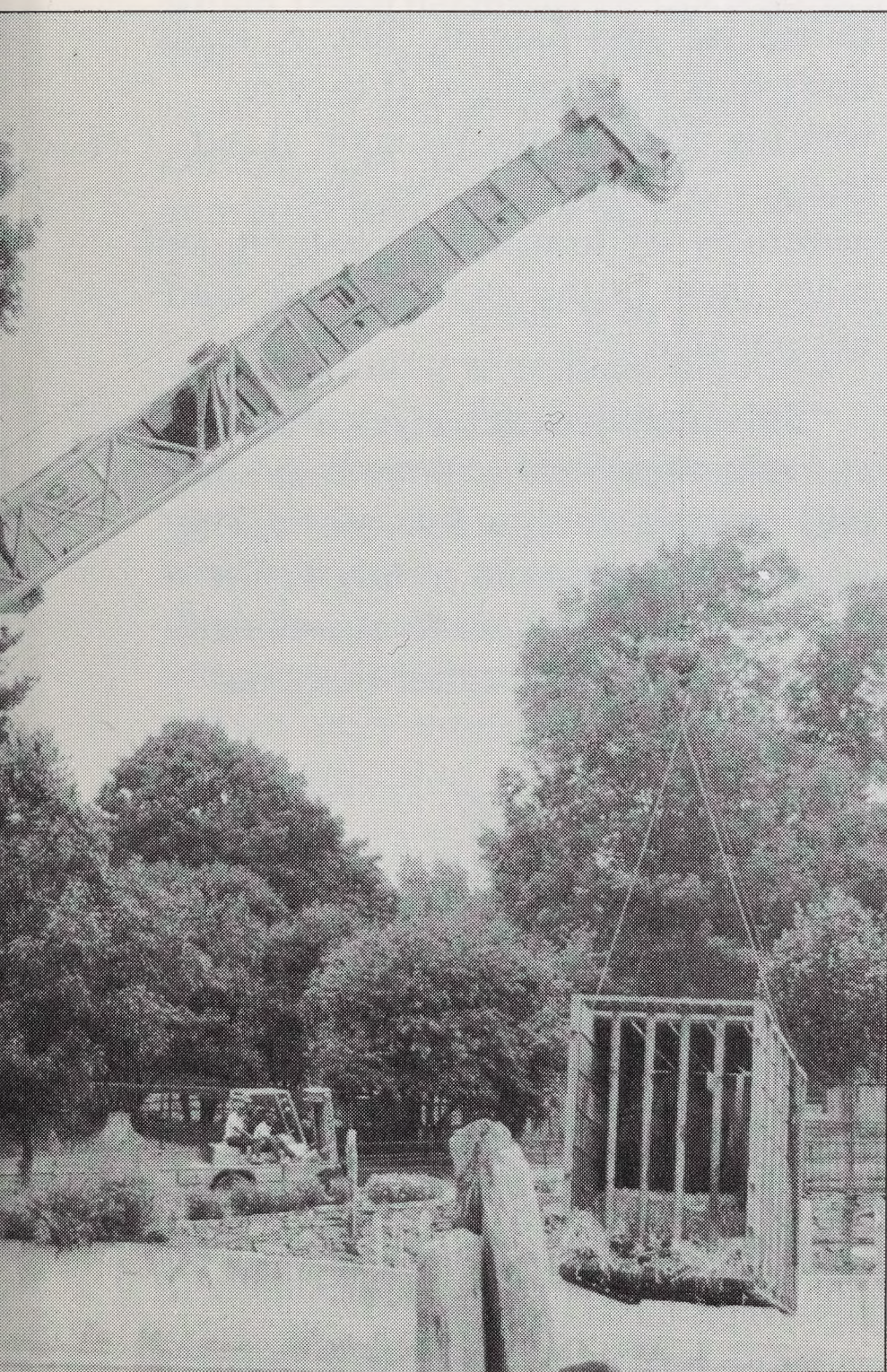
tion has soared far above the "sticker price," due, in part, to higher transportation costs and increased administrative work caused by the complex new restrictions that govern trade in endangered species.

Even "free" animals from overseas are expensive. For example, several years ago, the Rotterdam Zoo gave NZP two cranes. The birds' shipping and crating costs from Holland to New York were \$1,292; the 30-day quarantine period and feedings in New York cost \$294; a broker who met the shipment, cleared it through customs, and delivered it to the quarantine station had to be paid

\$1,032; finally, because airline schedules precluded shipping the cranes by plane, two keepers drove them to the National Zoo at a cost of \$300. The gift from Holland cost NZP nearly \$3,000.

This situation is not unusual. "The cost of shipping," Xanten said, "often exceeds the cost of the animals."

When the Zoo needs cash beyond its federal allocations to acquire animals, said Finance Officer James Fitzpatrick, it turns to an NZP fund that is supported by animal sales and private donations. In addition, two years ago FONZ established the Theodore H. Reed Animal Acquisition

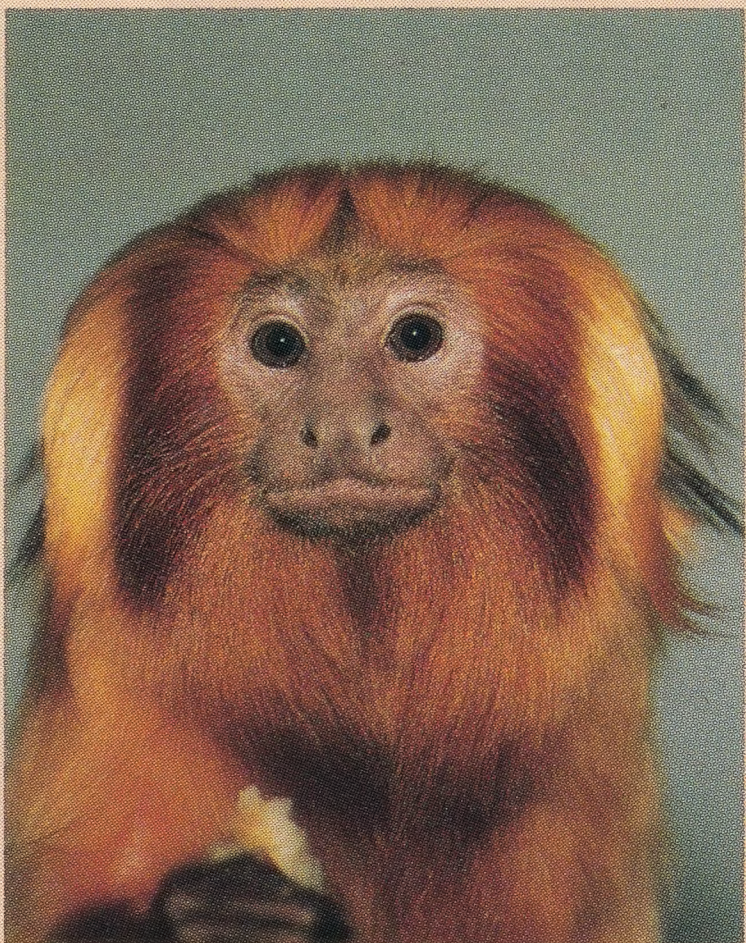


*loan was free, Pandu's transportation costs were not. The bill for his 2,713-mile trip was paid with ZooFari proceeds.*



*When breeding programs are exceptionally successful, zoos may trade or sell surplus animals to each other. NZP bought this American flamingo last year from the Philadelphia Zoo.*





Jessie Cohen, NZP Graphics

## ZooFari

Each year, FONZ adopts a region of the world as the focus of ZooFari, its annual fundraiser to support the National Zoo's animal acquisition activities.

On Thursday evening, May 22, the National Zoo will come alive as ZooFari '86 celebrates the bravura of Brazil, a country rich in culture, cuisine, and wildlife. The National Zoo has enjoyed a fruitful relationship with Brazil, typified by its successful program to breed the rare golden lion tamarins and reintroduce them to the Brazilian jungle.

Zoo supporters attending the event will have an opportunity to share the excitement of a Brazilian street market at the silent auction, taste native cuisine, and experience a night in Rio as they samba to a big band sound.

All proceeds from the event will support the National Zoo's animal acquisition priorities, including special loans from other zoos, breeding of endangered species, new purchases, and paying costs associated with gifts.

Due to cost limitations, ZooFari invitations will not be mailed to FONZ members except by request. For a personal invitation to the \$100/ticket event or information about donating to the Theodore H. Reed Animal Acquisition Fund, contact Jim Mathews at 673-4960.

Fund, which last year paid the transportation costs of the zoo's new Indian rhinoceros. This fund is also supported by private donations and by an annual benefit event, ZooFari (see sidebar, left).

Spiraling prices are nothing new. For years, zoo directors have been trying to save money through shrewd trading. Even before World War II, an orangutan went for \$3,000, and a pair of giraffes cost \$7,000—princely sums in those days.

Today, paper money has been replaced by paperwork, as zoos around the world cooperate to swap or loan animals on a long-term basis. Such arrangements allow zoos to channel more money into breeding programs and health care for exotic animals, rather than their purchase.

In fact, most zoos would much rather trade than sell, getting something in return. Said Xanten, "With us a sale is a last resort. For instance, we would rather give a male giraffe to another zoo to put in a breeding program for a few years. Then if something happened to our male, we could always go to that zoo and ask for the return of our animal or one of its offspring."

While direct, one-for-one trades are rare, zoos often send animals to other zoos to build a surplus credit position. For instance, zoo A might send a wattled crane worth \$6,000 to zoo B and get nothing in trade. But at a later date, if zoo B finds itself with a surplus pair of Stanley cranes worth \$2,000, zoo A may receive these birds and still wind up with a credit of \$4,000, which can be used to obtain additional mammals, birds, or reptiles in the future.

### Breeding Programs

Zoos also cooperate in breeding programs that are an increasingly common means of acquiring new animals. The National Zoo's 1984 success in breeding Cuban crocodiles—with a female loaned by West Germany's Wilhelma Zoo—will benefit several zoos seeking to acquire these rare reptiles.

The most costly way to obtain an animal is to buy one from abroad, said Block, who oversees much of the detailed paperwork involved in an acquisition. In addition to the purchase price, the Zoo must pay for quarantines, health tests, crating, and air shipping. But no one complains about the paperwork, because it serves to protect the animals. Permits, said Primate Collection Manager Lisa Stevens, are "a very positive result of legislative actions both here and abroad."

Although their role has declined in recent decades, dealers still play a part in the acquisition of animals, especially those that must pass through overseas quarantine centers. It might cost a zoo \$20,000 to locate a sable antelope, clear it through the various overseas quarantine procedures, and fly it to the United States. On the other hand, a dealer importing a group of animals could bring the same antelope to the United States for \$7,500.

"I know the zoo business may sometimes look rather commercial to outsiders," said Xanten, "But we really don't look at animals as if they're wearing dollar signs. We look at our charges as living creatures and genuinely try to maintain, exhibit, and breed them in the most humane manner possible.

"This includes exchanges, trades, and what-have-you. We've sent surplus animals to reputable zoos asking absolutely nothing in return, rather than risk selling them to questionable roadside exhibits or other marginal operations."

More and more, zoos are relying on breeding programs to preserve disappearing species and stock the modern "ark," so animal acquisitions, especially loans, are increasingly motivated by conservation goals. "But," said NZP spokesman Hoage, "the public also clearly benefits from our successful participation in the animal acquisition process because we never lose sight of our goal—to generate public respect and reverence for wildlife by giving people a chance to experience animals close-up." □



*Years Ago . . .*

# Making History

*The following paragraphs are excerpted from the first chapter of Helping to Build the Ark: A History of the Friends of the National Zoo, 1958-1983, written by Montgomery S. Bradley and edited by Sally Tongren. The complete booklet is available for \$3, prepaid, from FONZ History, National Zoological Park, Washington, D.C. 20008.*

**O**n a cold January evening in 1958, a small group of people drawn from the Connecticut Avenue Citizens' Association met at the Cleveland Park Library. The meeting was called to discuss ways in which these neighbors of the National Zoological Park could help that institution and its new director to emerge from the financial and administrative morass that was strangling the Zoo.

It was a time when zoos everywhere were beginning to rethink their mission, spurred on by the increasing number of species of animals that were threatened with extinction. They were turning to improved breeding programs, working for greater knowledge of their animals and toward more intensive efforts for public education.

The National Zoo's most urgent need was money. The District budget for 1959 had included certain additional funds to cover some of the Zoo's most critical requirements over and above the operating budget. It was the probability that these would be deleted in the final budget that prompted that first evening meeting of what would become the Friends of the National Zoo, or FONZ. On January 20, 1958, the Connecticut Avenue Citizens' Association drafted and approved a resolution directed to

the District Commissioners asking that the Zoo budget be passed without curtailment.

Following this action, it became clear that the needs of the National Zoo could not be addressed by a committee of a citizens' association. There must be a separate organization devoted to this purpose. So, on April 10, 1958, the new Friends of the National Zoo came into being.

Former NZP Director William Mann became the first of four charter members whose donations were accepted that night, and his enthusiasm was reflected in the news items carried by the Washington papers the following day. "His eyes shining with excitement, his grey hair

half combed, he was one of the first to write a \$50 check and become a charter member. 'I never could get such a needed group started while I was at the Zoo,' he confessed to a reporter."

The new organization had funds, a bank account, and was off and running. Many citizens' organizations set off bravely and then lose momentum, but FONZ has always been blessed with enthusiastic, able board members with staying power, something that was now badly needed. A small group was going up to tilt against the federal windmill to obtain the support that they felt was needed to save the National Zoo. The results were to prove the potential of such a group. □



**From 1965 to 1972, FONZ's logo was a drawing of Mohini, the Zoo's famous white tigress.**



FONZ helped  
stock the NZP  
“ark” by bringing  
Pandu to  
Washington  
(p. 20).



Friends of the National Zoo  
National Zoological Park  
Washington, D.C. 20008

*Address Correction Requested*

Nonprofit Organization  
U.S. Postage  
PAID  
Washington, D.C.  
Permit No. 6282